Highway Performance Monitoring System Catalog

New Technology and Techniques Part II Updated

October 2003

Department of Transportation
Federal Highway Administration (FHWA)
Office of Highway Policy Information

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INTRODUCTION

PURPOSE, USE, CONTENT, AND BACKGROUND OF CATALOG

➢ Audience

The Catalog on HPMS new technologies and techniques is intended for use by:

1. State employees or contractors involved in the preparation of the HPMS submittal.
2. State employees or contractors involved in other data activities from which HPMS data are extracted.
3. FHWA field personnel involved in HPMS.

➢ Purpose

The purpose of the catalog is to create a network to share information on new technologies and techniques for collecting and reporting HPMS data.

➢ Definition

New technology or technique:

Any new technology or technique which the State has employed in the past five years or is currently considering which increases the efficiency, quality, consistency and/or safety of data collection by the State and is used or could be used in the preparation of the annual HPMS submittal to FHWA. Information on current research activities is also included.

➢ Scope

Since much of the data for HPMS comes from other sources and activities, the use of the term HPMS is in the broadest context and includes new technologies and techniques used in these other sources and activities as well as the direct collection and processing of HPMS. For example, if HPMS pavement condition

information comes from the State pavement management system and States are using a new technology or technique for the collection of data, they are encouraged to include the activity in the catalog.

➢ Content

Part Two contains individual forms which were prepared by the States. They are sorted by the following categories:

1. Field data collection technique
2. GIS/GPS application for data collection integration and presentation
3. Other data integration and presentation technique
4. Automated data collection equipment
   - ⇨ pavement characteristics and condition
   - ⇨ traffic/travel
   - ⇨ congestion
   - ⇨ other (specify)
5. Private data sources and privatization of data collection

Each form contains one new technology application or technique. The forms contain the following information:

- ➢ Contact person for the particular new technology application or technique, including organization, name, address, phone, fax, and e-mail
- ➢ Category
- ➢ Description of technology or technique application
- ➢ Description of use or possible use for HPMS. If the project is in the research phase, a description of the research project is included.
- ➢ Results of the use in terms of improved efficiency, quality, consistency, safety of data collection and other benefits.

Each form contains enough information to allow users to make decisions on which States to contact if they want to obtain additional information on a particular technology or technique or to share information on experiences. The purpose of the catalog is to create a network to share information.

➢ Background

This catalog was prepared as part of the FHWA initiative to reassess the current HPMS. It was designed so that it could be periodically updated and supplemented. States are encouraged to update their submittals and add new entries.

New or modified forms should be sent to: Robert Rozycki, Office of Highway Policy Information - HPPI-20, Federal Highway Administration, 400 Seventh Street, SW, Washington, DC 20590, or robert.rozycki@fhwa.dot.gov.

PART TWO

HPMS NEW TECHNOLOGIES AND TECHNIQUES
FORMS (listed by category)

FHWA Data Collection Techniques

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Arkansas	Agency: AHTD	
Contact: Keith Merritt	Title: Staff Planning Engineer	
Street Address: 10324 Interstate 30		
City: Little Rock	State: Arkansas	Zip Code: 72209
E-Mail: Keith.Merritt@ahtd.state.ar.us	Phone: (501) 569-2111	Fax: (501) 569-2004

CATEGORY		
X	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Our road inventory personnel use Distance Measuring Instruments (DMI) to obtain mile points along routes being logged. The DMI can be changed from miles to feet for measuring bridge lengths.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
When HPMS is field checked, the DMI is used for measuring the sample section length.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The DMI provides accurate measurements.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Hawaii	Agency: Department of Transportation	
Contact: Goro Sulijoadikusumo	Title: CE III	
Street Address: 600 Kapiolani Boulevard		
City: Honolulu	State: Hawaii	Zip Code: 96813
E-Mail:	Phone: 808-587-1839	Fax: 808-587-1787

CATEGORY

X	Field Data Collection Technique		
X	GIS/GPS application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
	Automated Data Collection Equipment		
			Pavement Characteristics and Condition
			Traffic/Travel
			Congestion
			Other (specify)
	Private Data Sources and Privatization of Data Collection		

Description of Technology or Technique Application:
Logging of digital images of the highway system. The system collects full-frame, high resolution, geo-referenced images of the road. The images and reference data are stored in the standardized Joint Photographic Expert Group (JPEG) compression format.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Extracting HPMS data from the video logging system such as curves, grades, number of lanes, and possibly lane widths. The video logging system can also provide data for the linear referencing system required for the HPMS.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The system provides verification of the HPMS data currently recorded. It also provides data that are difficult to obtain, data currently only on project plans. The accuracy of the data will be greatly improved.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Maine	Agency: DOT	
Contact: Edward C. Beckwith	Title: HPMS Coordinator	
Street Address: Management Systems Div., 16 State House Station, Department of Transportation Building		
City: Augusta	State: Maine	Zip Code: 04333-0016
E-Mail: edward.beckwith@state.me.us	Phone: 207-287-4662	Fax: 207-287-3292

CATEGORY

X	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
	X	Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Since June of 1998 the Department has been using an ARAN (Automatic Road Analyzer) van to collect PCR and IRI data on the State Highway and State Aid Highway systems. The van automatically collects rut and ride data (Type I). Video cameras collect pavement data, which is post processed by a technician to determine PCR assignments. In addition to pavement cameras the van is equipped with forward, right, and left looking cameras to pick up inventory and right of way data. The data collected by these cameras has proved helpful in updating of inventory and roadway alignments.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The International Roughness Index (IRI) and Pavement Condition Rating (PCR) after being post processed is loaded into the pavement management database. Annually this data is run through routines to update our primary transportation database. Our HPMS non-sampled sections are generated from this data. The sample sections are then updated using a batch update file.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The data gathered is analyzed to assign a Pavement Condition Rating (PCR), predict future deterioration, and make recommendations on where pavement expenditures should be made. This data is also used to update our HPMS section data.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Montana	Agency: Department of Transportation	
Contact: Denise Moudree	Title: Planner	
Street Address: 2701 Prospect Avenue, PO Box 201001		
City: Helena	State: Montana	Zip Code: 59620-1001
E-Mail: Dmoudree@state.mt.us	Phone: 406-444-7294	Fax: 406-444-7671

CATEGORY

X	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
The Montana Department of Transportation (MDT) contracted with Mandli Communications to digilog (logging of digital images) and collect road inventory data. Mandli collected images on all of Montana's Interstate, non-Interstate NHS, primary and secondary roads. MDT is pursuing the use of GPS on our HPMS sample sites in coordination with our mapping section. A target data for implementation has not yet been established.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
MDT employees are able to "drive" Montana's roadways from their computer. We will be using the digital images to fulfill some of the HPMS inventory requirements.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Because of the size of Montana, data collection is a very time consuming and costly task. The digital images will save the MDT both time and money plus inventorying can be done in the winter months as well as the summer.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: New Jersey	Agency: New Jersey Department of Transportation	
Contact: Anthony M. Varone	Title: Project Engineer	
Street Address: 1035 Parkway Ave. Trenton, N. J. 08625		
City: Trenton	State: N.J.	Zip Code: 08625
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CATEGORY

X	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Road inventory data regarding HPMS sample sections is collected with the use of a laptop listing all data items for HPMS. Software used for data collection was developed in a Paradox format.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Data items for HPMS are updated through the use of a laptop computer and are than downloaded to the office once all sample sections are completed. Information/data is than processed and analyzed through FHWA software in order to meet the requirements for the HPMS submittal.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Data collection is now more efficient, faster and with less errors due to the computerized collection process.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: New York	Agency: Department of Transportation	
Contact: Rick Bennett	Title: Pavement Manager	
Street Address: 1220 Washington Ave, Building 7A Room 506		
City: Albany	State: NY	Zip Code: 12232
E-Mail: rbennett@dot.state.ny.us	Phone: 518-457-1965	Fax: 518-485-5259

CATEGORY

X	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
	X	Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application: Use high speed profiler (Roadware ARAN) for network level data collection – IRI, rut, fault, crossfall, radius, digital images, GPS

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project): Collect IRI data for HPMS samples.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits): Automated survey provides data to meet HPMS requirements, and can also be used in pavement management decision making.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: North Dakota	Agency: North Dakota Department of Transportation	
Contact: Robert Olzweski	Title: Transportation Senior Manager	
Street Address: 608 East Boulevard Ave		
City: Bismarck	State: North Dakota	Zip Code: 58505-0700
E-Mail: rolzwesk@state.nd.us	Phone: (701) 328-3479	Fax: (701) 328-4545

CATEGORY

X	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Roadway Information Management System (RIMS)

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits): Our pavement AADT's, SN numbers, curve and grade data are stored in RIMS. The HPMS file is electronically updated from RIMS every year. Many hours of manual keying and updating have been eliminated.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Ohio	Agency: Department of Transportation	
Contact: Tony Manch	Title: Engineer	
Street Address: 1980 West Broad Street		
City: Columbus	State: Ohio	Zip Code: 43223
E-Mail: tmanch@odot.dot.ohio.gov	Phone: 617-466-3075	Fax: 617-752-8646

CATEGORY

X	Field Data Collection Technique
	GIS/GPS application for Data Collection Integration and Presentation
	Other Data Integration and Presentation Technique
X	Automated Data Collection Equipment
	DELETED
	Private Data Sources and Privatization of Data Collection

Description of Technology or Technique Application:
Microwave radar (RTMS) side mounted radar that can be used to collect up to 8 lanes of volume traffic data. Can be used in a permanent (ac power) or portable application (battery power).

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
If used on an urban Interstate can collect volume data. Can be used to replace road sensors (loops) to make an existing ATR operational.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Increased safety because it is an off-road sensor. Used by ARTJMIS (Cincinnati ITS) for urban interstate data collection. Used by technical services in a portable mode to collect data on high volume routes in urban areas.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Ohio	Agency: Department of Transportation	
Contact: Tony Manch	Title: Engineer	
Street Address: 1980 West Broad Street		
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CATEGORY

X	Field Data Collection Technique
	GIS/GPS application for Data Collection Integration and Presentation
	Other Data Integration and Presentation Technique
X	Automated Data Collection Equipment
	DELETED
	Private Data Sources and Privatization of Data Collection

Description of Technology or Technique Application:
Research project will be underway to classify vehicles from the side of the road. Goal is to be able to obtain Federal Highway Administration 13 vehicle class from the side of the road.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Vehicle class is required on each HPMS section.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Safety will increase because we will not have to get on the roadway to place axle sensors.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Tennessee	Agency: Department of Transportation	
Contact: Steve Allen	Title: Transportation Manager 1	
Street Address: Suite 1000, James K. Polk Building, 505 Deaderick Street		
City: Nashville	State: Tennessee	Zip Code: 37243-0344
E-Mail: sallen@mail.state.tn.us	Phone: 615-741-6741 (Allen)	Fax : 615-532-0353

CATEGORY

X	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
	X	Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
The University of Tennessee is reviewing Tennessee's random sampling of local roads for statistical accuracy.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Provides local counts for developing local VMT.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The local sample data provides HPMS requirements and VMT for use in the Department.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Utah	Agency: Department of Transportation	
Contact: Jerry Arnold	Title: HPMS Coordinator	
Street Address: 4501 South 2700 West		
City: West Valley City	State: Utah	Zip Code: 84119
E-Mail: Jarnold@utah.gov	Phone: 801-965-4135	Fax:

CATEGORY

X	Field Data Collection Technique	
X	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
UDOT has converted its paper based roadway inventory process into a new process that incorporates a laptop Microsoft Access software application utilizing pf-key item entry with automated acquisition of DMI and GPS information.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The collection system provides pull down lists to assist in correctly coding the HPMS data items and provides an automated transfer into the UDOT HPMS system. The GPS coordinates will enhance the accuracy of HPMS data and in the future provide the ability to easily move into a department GIS environment.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The new process eliminates the inefficient manual entry of HPMS data. Data collection is faster with minimal errors and increased data integrity.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Vermont	Agency: Transportation	
Contact: Michael Hedges	Title: Pavement Management Engineer	
Street Address: 1 National Life Drive		
City: Montpelier	State: Vermont	Zip Code: 05633-5001
E-Mail: michael.hedges@state.vt.us	Phone: 802-828-2793	Fax: 802-828-2848

CATEGORY

X	Field Data Collection Technique		
	GIS/GPS application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
	Automated Data Collection Equipment		
		X	Pavement Characteristics and Condition. **IRI L& RWP, Rut depth, fatigue, Trans Cracks.**
			Traffic/Travel
			Congestion
			Other (specify)
	Private Data Sources and Privatization of Data Collection. **Have always used data collection consultant.**		

Description of Technology or Technique Application:
Automated distress and IRI and Rut data collection as part of PMS network level survey.
Deighton dRoad and dMap PMS Arc View GIS.
In previous years, have used IMS Laser Pave system. For 2000-2003, Roadware Wisecrax.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
IRI data is provided to HPMS group via MS Excel file.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Vermont	Agency: Transportation	
Contact: Amy Gamble	Title: Traffic Research Engineer	
Street Address: 1 National Life Drive		
City: Montpelier	State: Vermont	Zip Code: 05633-5001
E-Mail: amy.gamble@state.vt.us	Phone: 802-828-2685	Fax: 802-828-5742

CATEGORY

X		Field Data Collection Technique
		GIS/GPS application for Data Collection Integration and Presentation
		Other Data Integration and Presentation Technique
		Automated Data Collection Equipment
		Pavement Characteristics and Condition
	X	Traffic/Travel
		Congestion
		Other (specify)
		Private Data Sources and Privatization of Data Collection

Description of Technology or Technique Application:
Volume data from the long-term counters is read into laptop computers in the field. Weigh-in-Motion (WIM) data is collected using modems. The WIM and other long-term data are processed using IRD and TransPlus software and are then processed into reports and electronic files using Basic-language programs developed in house. The AADT's are read into a HPMS spreadsheet; where counts are not available AADT estimates are projected from previous data.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
This system will soon be replaced or supplemented by a TMS being developed for the New England states by GisTrans. This will facilitate access to existing data by accumulating it into one system and associating it with GIS maps.

PART TWO

HPMS NEW TECHNOLOGIES AND TECHNIQUES—
FORMS (listed by category)

GIS/GPS Application for
Data Collection Integration and Presentation

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Arkansas	Agency: AHTD	
Contact: Mark A. Evans	Title: Pavement Management Engineer	
Street Address: 10324 Interstate 30		
City: Little Rock	State: Arkansas	Zip Code: 72209
E-Mail: Mark.Evans@ahtd.state.ar.us	Phone: (501) 569-2223	Fax: (501) 569-2070

CATEGORY

	Field Data Collection Technique	
X	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
We are investigating the use of GPS equipment with the AHTD's Automatic Road Analyzer (ARAN) unit. In conjunction with spatial analysis software we should be able to "lock down" locations and points shared by various databases. This should allow for seamless integration of data.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Using geographic coordinates provided by the GPS, the Department could more accurately link the databases that provide data for the HPMS.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The use of GIS/GPS technology could provide more accurate data, with regards to location, than is currently available to the HPMS.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Colorado	Agency: Department of Transportation	
Contact: Tim Baker	Title: Unit Manager	
Street Address: 4201 E. Arkansas Avenue		
City: Denver	State: Colorado	Zip Code: 80222
E-Mail: Tim.J.Baker@dot.state.co.us	Phone: 303-757-9805	Fax: 303-757-9727

CATEGORY

X	Field Data Collection Technique
X	GIS/G.P.S. application for Data Collection Integration and Presentation
	Other Data Integration and Presentation Technique
	Other (specify)
	Private Data Sources and Privatization of Data Collection

DELETED

Description of Technology or Technique Application:
A systematic review of HPMS samples that includes the additional collection of G.P.S. information and a digital camera picture of various locations within the sample, with at least one picture taken in the general location where the traffic count is being conducted.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The project allows GIS mapping of the sample locations and some additional special querying capacity by linking files to the HPMS database. In addition, we are using this as a quality control component for HPMS by storing various pictures of the location in order to document changes in the sample, provide field staff with an approximate appearance of the sample and provide a pictorial record of the count area for future data collection integrity.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Improved data quality through systematic review of sample data by conducting a thorough review of existing data. Ability to spatially display HPMS data via GIS software and provide a pictorial record of samples that can be used to verify data without the need for immediate field review.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Connecticut	Agency: Transportation	
Contact: Angelo Asaro	Title: Transportation Supervising Planner	
Street Address: 2800 Berlin Turnpike, P.O. Box 317546		
City: Newington	State: Connecticut	Zip Code: 06131-7546
E-Mail: Angelo.Asaro@po.state.ct.us	Phone: (860) 594-2107	Fax: (860) 594-2056

CATEGORY

	Field Data Collection Technique	
X	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
The Connecticut Department of Transportation uses GIS software to generate various roadway network maps illustrating HPMS sections and related data.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
These maps provide the HPMS field crews with a graphic representation of the beginning and ending of each section on the state roadway network. Also, maps are created showing various roadway characteristic data (i.e. IRI, ADT's, Functional Classification, etc.) on HPMS sections.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
These graphic representations of the HPMS system provide the field crews a more efficient method of locating the sections. The HPMS roadway characteristic maps are used by the office personnel for various data analyses and presentations.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Florida	Agency: Department of Transportation	
Contact: Gordon Morgan	Title: Manager, Highway Data Section	
Street Address: 605 Suwannee Street, M.S. 27		
City: Tallahassee	State: FL	Zip Code: 32399-0450
E-Mail: gordon.morgan@dot.state.fl.us	Phone: (850) 414-4730	Fax: (850) 488-4752

CATEGORY

	Field Data Collection Technique	
X	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Florida DOT uses GIS to plot data values and HPMS sample locations directly from our database.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
By showing the data on maps, it is often easier to spot inconsistent or inappropriate data. Plotting the sample locations makes it unlikely that a sample will be overlooked for data collection.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Data are of higher quality and more consistent after they are reviewed on maps. Efficiency of data collection is improved by planning data collection using accurate and up-to-date sample location maps.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Florida	Agency: Department of Transportation	
Contact: Gordon Morgan	Title: Manager, Highway Data Section	
Street Address: 605 Suwannee Street. M.S. 27		
City: Tallahassee	State: FL	Zip Code: 32399-0450
E-Mail: gordon.morgan@dot.state.fl.us	Phone: (850) 414-4730	Fax: (850) 488-4752

CATEGORY

	Field Data Collection Technique	
X	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Florida DOT plans to use GPS and aerial photography to obtain geographic alignment and location data.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
A research project is underway to determine the feasibility of integrating GPS and aerial photography data collection with the more traditional methods.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Data are expected to be of higher quality and more consistent. The data collection also promises to be more efficient, especially on a large scale.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Hawaii	Agency: Department of Transportation/Highways Division	
Contact: Goro Sulijoadikusumo	Title: Planning Survey Engineer	
Street Address: 869 Punchbowl Street, Suite 301		
City: Honolulu	State: HI	Zip Code: 96813
E-Mail: goro.sulijoadikusumo@hawaii.gov	Phone: 808.587.1839	Fax: 808.587.1787

CATEGORY

	Field Data Collection Technique	
X	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Using Geomedia Webmap Professional, provide any PC on the DOT's network access to HPMS data via a web browser within a GIS/intelligent map environment. Users can select various data items such as AADT and have these items thematically displayed by route or area of interest. Most significantly, users can select a base year (i.e. 2002) and compare the data element against a number of comparison years (i.e. 1997, 1998, 1999, 2000, 2001). Data from all years will appear offset against the basemap. Any HPMS segments where the data item has changed in any of the comparison years will appear highlighted in red on the map. A text report can also be generated in a separate window if desired by the user.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Possible discrepancies or errors in the HPMS data can easily be identified. Data trends and analyses becomes much more simplified.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Improved data quality as data can be viewed more holistically. Improved access and use as HPMS data is available to almost every employee in an understandable context.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Illinois	Agency: Transportation	
Contact: Rob Robinson	Title: Data Management Unit Chief	
Street Address: 2300 S. Dirksen Parkway		
City: Springfield	State: IL	Zip Code: 62764
E-Mail: robinsonre@nt.dot.state.il.us	Phone: (217) 785-2353	Fax: (217) 524-6251

CATEGORY

	Field Data Collection Technique	
X	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
The Illinois Department of Transportation has been using a comprehensive ArcView GIS system for the last several years to include data about 110,000 miles of roadway throughout the state. The types of data within the GIS applications include roadway characteristics, accident data, traffic data, HPMS, annual and multi-year programmed projects, and the digital ortho-quadrangle aerial photos.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The GIS applications are used to review and identify possible discrepancies in the HPMS data. Plots are generated from GIS application to better analyze and display HPMS information. The linear reference system network for the HPMS submittal is also generated from the GIS coverages.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Using the DOQs and other electronic photos tied to the base roadway network have been extremely helpful in reviewing data which has limited the amount of field visits. IDOT has created several interactive GIS applications on the Internet to display traffic data, current road construction, and check winter road conditions.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Iowa	Agency: Department of Transportation	
Contact: Peggi Knight	Title: Trans. Eng. Mgr.	
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City: Ames	State: Iowa	Zip Code: 50010
E-Mail: Pknight@max.state.ia.us	Phone: 515-239-1380	Fax: 515-239-1828

CATEGORY

	Field Data Collection Technique	
X	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Integrating HPMS Data Source (Base Record) with CADD maps to create a GIS for maintenance of the data. This will allow the Department of Transportation (DOT) to better integrate HPMS data with other transportation data (accident locations, roadside feature inventories, etc.) maintained by the DOT.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The HPMS data will be maintained in the GIS system and exported to the PC HPMS program for preparation of submittal.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Has eliminated duplication of effort in maintaining data on maps and base record data separately.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Maine	Agency: DOT	
Contact: Edward C. Beckwith	Title: HPMS Coordinator	
Street Address: Management Systems Division, 16 State House Station, Dept. of Transportation Building		
City: Augusta	State: Maine	Zip Code: 04333-0016
E-Mail: edward.beckwith@state.me.us	Phone: 207-287-4662	Fax: 207-287-3292

CATEGORY

	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
The Department now employs a GIS-Linked Data warehouse entitled TIDE which stands for Transportation Information for Decision Enhancement. The system contains Administrative, Pavement Management, Inventory, Safety, Bridge, Geometric and Speed Zone data on all public and some private roads. The data is accessed using GQL and the results can be displayed in table form or the results passed to arcview to create maps.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The TIDE has proven helpful in locating HPMS sample sections and relating data elements for editing and updating purposes.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
TIDE provides user-friendly access to the departments transportation data. TIDE enables the casual user to develop custom queries to retrieve data without the need for a programmer's assistance. This has increased efficiency by reducing the time required to access data, and reduced the pressure on limited programmer resources.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Maine	Agency: DOT	
Contact: Edward C. Beckwith	Title: HPMS Coordinator	
Street Address: Management Systems Division, 16 State House Station, Dept. of Transportation Building		
City: Augusta	State: Maine	Zip Code: 04333-0016
E-Mail: edward.beckwith@state.me.us	Phone: 207-287-4662	Fax: 207-287-3292

CATEGORY

X	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Portable GPS equipment used to gather centerline and attribute information.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Information is used to update mainframe inventory database and the Department's GIS base maps.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
This method is both more efficient and more accurate. The Department is also participating in the State's E911 effort, which is also using GPS technology.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: New Mexico	Agency: State Highway and Transportation Department	
Contact: Antonio Abeyta	Title: Management Analyst	
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City: Santa Fe	State: New Mexico	Zip Code: 87504-1149
E-Mail: Antonio.abeyta@nmshtd.state.nm.us	Phone: 505-827-5543	Fax: 505-989-4983

CATEGORY

	Field Data Collection Technique	
X	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
HPMS/GIS is a windows based HPMS/GIS application consisting of the Federal Highway Administration HPMS PC Software, relational HPMS data tables built from the mainframe database, historical HPMS data tables and GIS software products.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The user will use point and click navigation to perform a variety of tasks including data importing, editing and validation, queries of current and historical data, preparation and submittal of the HPMS data and HPMS/GIS and LRS/GIS mapping.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
More efficient management of the HPMS data, improvement in data quality and the ability to present the HPMS data graphically using GIS applications.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Virginia	Agency: Department of Transportation	
Contact: Dan Widner	Title: GIS Program Manager	
Street Address: 1401 East Broad Street		
City: Richmond	State: VA	Zip Code: 23219
E-Mail: widner_dk@vdot.state.va.us	Phone: 804-786-6762	Fax: 804-692-0958

CATEGORY

X	Field Data Collection Technique	
X	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
The Virginia Department of Transportation is in the process of updating its GIS base map centerlines from an accuracy of +/- 40 feet to +/- 2 meters. This is being done through a combination of technology that includes GPS, inertial navigation, and terrestrial photogrammetric means using photolog images. The data collection effort will occur over the next 2 years on a statewide basis. At present, a 3 county pilot is underway. The subsequent centerlines will be made available through a web-enabled enterprise GIS, allowing for the linking of business and spatial data.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The new centerlines will be linked to the legacy database information where the HPMS report data originates. The legacy database's link-node LRS will be available through a linear reference translator that will translate the link-node LRS into route-milepost and/or geographic latitude/longitude. Accessibility to the translator is dependent on the 3 county pilot described above.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The results will provide improvements in the currency and accuracy of the data being reported and accessibility to the data.

PART TWO

HPMS NEW TECHNOLOGIES AND TECHNIQUES— FORMS (listed by category)

Other Data Integration and Presentation Technique

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Arkansas	Agency: AHTD	
Contact: Bobby Bradshaw	Title: Research Information Coordinator	
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City: Little Rock	State: Arkansas	Zip Code: 72209
E-Mail: Bob.Bradshaw@ahtd.state.ar.us	Phone: (501) 569-2480	Fax: (501) 569-2004

CATEGORY

	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
The Department has implemented the Multimedia-based Highway Information System (MMHIS). The MMHIS uses JPEG images to display Right-of-Way imagery of the State's highways with links to data pertaining to the section displayed.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The HPMS data could possibly be linked to the MMHIS.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
If the HPMS data is linked to the image, it would provide a means for Department personnel to view the HPMS data along with the image of the corresponding roadway.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: California	Agency: Department of Transportation	
Contact: Brian Domsic	Title: Senior Transportation Engineer	
Street Address: 1120 N Street MS #38		
City: Sacramento	State: California	Zip Code: 94274-0001
E-Mail: brian.Domsic@dot.ca.gov	Phone: (916) 653-3272	Fax: (916) 654-6583

CATEGORY

	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:

The Caltrans photolog was transferred from the 35mm film to CDs then placed on an intranet site for all of Caltrans to access. About a third of the state highway mileage is updated each year.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):

The physical characteristics of any state highway can be easily reviewed whenever there's a question about the field conditions.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):

Improved efficiency and safety of data collection.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: California	Agency: Department of Transportation	
Contact: Brian Domsic	Title: Senior Transportation Engineer	
Street Address: 1120 N Street MS #38		
City: Sacramento	State: California	Zip Code: 94274-0001
E-Mail: brian.Domsic@dot.ca.gov	Phone: (916) 653-3272	Fax: (916) 654-6583

CATEGORY

	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:

The Digital Highway Inventory Photography Program provides high-resolution aerial imagery of the State Highway System. This "DHIPP" is available on the Caltrans intranet.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):

The physical characteristics of any state highway can be easily reviewed whenever there's a question about the field conditions.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):

Improved efficiency and safety of data collection is effected.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: California	Agency: Department of Transportation	
Contact: Brian Domsic	Title: Senior Transportation Engineer	
Street Address: 1120 N Street MS #38		
City: Sacramento	State: California	Zip Code: 94274-0001
E-Mail: brian.Domsic@dot.ca.gov	Phone: (916) 653-3272	Fax: (916) 654-6583

CATEGORY

	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
A searchable data base tool is available on the internet at http://web1.dot.ca.gov/hq/hpms/Page1.php

It enables the user to look up the functional classification of any route eligible for federal aid. The CRS map number is also given so the user can double check.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
HPMS is the basis for supplying the data.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
As this resource gains exposure, there should be fewer requests made for checking a roadway functional classification.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Florida	Agency: Department of Transportation	
Contact: Gordon Morgan	Title: Manager, Highway Data Section	
Street Address: 605 Suwannee Street, Mail Stop 27		
City: Tallahassee	State: Florida	Zip Code: 32399-0450
E-Mail: gordon.morgan@dot.state.fl.us	Phone: 850-414-4730	Fax: 850-488-4752

CATEGORY

	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
A Florida DOT contractor obtains videolog images of the State Highway System, in both directions, at 0.01 mile intervals. The images are stored and distributed on CD-ROMs. They are also put onto a large hard disk and made available to any Florida DOT employee using a browser on our intranet.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Quality control on many HPMS data items can be performed by reviewing the videologs rather than by making field investigations.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Using videologs improves the efficiency and safety of data review. This has the additional effect of encouraging more frequent reviews, thus improving data quality.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Kansas	Agency: Kansas DOT, Bureau of Transpiration Planning	
Contact: Kristy Rizek	Title: Road Systems Engineer	
Street Address: DSOB, 8th floor		
City: Topeka	State: KS	Zip Code: 66612-8168
E-Mail: kristyr@ksdot.org	Phone: 785-296-5130	Fax: 785-296-8168

CATEGORY

	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Kansas is currently running in parallel with the old mainframe, flat file, batch environment, and the new Exor Highways, client/server environment, relational database. The Exor Highways will be used for state system information, whereas the mainframe will continue to be used for non-state system information. Plans will be implemented in the future to transfer the non-state system to Exor Highways. One of the benefits of moving to Exor Highways is the flexibility and customization that it allows. Future software updates will allow for web based application.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Exor Highways has greatly increased access to data in the state system inventory database to the entire agency. It will facilitate batch updating of the HPMS database for the annual submittal.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Kansas anticipates improvement in efficiency of HPMS database maintenance that will translate into increased data integrity. Exor Highways allows for the data entry to be streamlined, decreasing the complexity and increasing the flexibility when compared to the mainframe system.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Tennessee	Agency: Department of Transportation	
Contact: Tom Eldridge/Gatha McCollum	Title: Information Systems Supervisor/HPMS Coordinator	
Street Address: Suite 900, James K. Polk Building, 505 Deaderick Street		
City: Nashville	State: Tennessee	Zip Code: 37243-0334
E-Mail: **teldridge@mail.state.tn.us** cgilliam@mail.state.tn.us	Phone: 615-741-3429 (Eldridge) 615-253-2419(McCollum)	Fax: 615-532-8451

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
	X	Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
A digital photolog is linked to the highway database. Tennessee Department of Transportation has indexed its highway inventory with the location along the roadway. This links the photolog data with all of the other data and the GIS.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Photos are used to aid in inventory of signing, speed zones, sight distance, intersection inventory, and other inventory items.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
There is less field inventory needed which makes data collection safer and more efficient.

PART TWO

HPMS NEW TECHNOLOGIES AND TECHNIQUES— FORMS (listed by category)

Automated Data Collection Equipment

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Arkansas	Agency: AHTD	
Contact: Mark A. Evans	Title: Pavement Management Engineer	
Street Address: 10324 Interstate 30		
City: Little Rock	State: Arkansas	Zip Code: 72209
E-Mail: Mark.Evans@ahtd.state.ar.us	Phone: (501) 569-2234	Fax: (501) 569-2070

CATEGORY

		Field Data Collection Technique
		GIS/GPS application for Data Collection Integration and Presentation
		Other Data Integration and Presentation Technique
X		Automated Data Collection Equipment
	X	Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
		Private Data Sources and Privatization of Data Collection

Description of Technology or Technique Application:
The AHTD is involved in a research project with the Mack-Blackwell Transportation Center to determine the accuracy of an automated pavement distress detection system. Currently, digital pavement images have been collected and analyzed for distresses using three different distress-rating protocols. The images were collected from asphalt pavements on Arkansas' non-Interstate NHS pavements. This processed data will be compared with manually collected distress data provided from the department's ARAN unit.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
This data could be used in obtaining data for HPMS.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
This project could improve the quality and consistency of reported data.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Kansas	Agency: Depart of Trans, Bureau of Materials & Research	
Contact: Rick Miller	Title: Assistant Geotechnical Engineer	
Street Address: 2300 Van Buren		
City: Topeka	State: Kansas	Zip Code: 66611-1195
E-Mail: rick@ksdot.org	Phone: 785-296-3008	Fax: 785-296-2526

CATEGORY

	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
	X	Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Laser-based automatic fault detection (the vertical movement of two adjacent slabs) using readings from laser profilometer.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Previously, faulting was a manual, visual survey. Faulting data is an integral part of the Pavement Management System data that Kansas Department of Transportation maintains.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Laser-based automatic fault detection provides greater speed of data collection and more objective, consistent, and accurate faulting data.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: New Mexico	Agency: State Highway and Transportation Department	
Contact: Tito Medina	Title: Planning Supervisor	
Street Address: P.O. Box 1149		
City: Santa Fe	State: New Mexico	Zip Code: 87504-1149
E-Mail: tito.medina@nmshtd.state.nm.us	Phone: 505-827-5201	Fax: 505-827-5550

CATEGORY

	Field Data Collection Technique		
	GIS/GPS application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
X	Automated Data Collection Equipment		
	X	Pavement Characteristics and Condition	
		Traffic/Travel	
		Congestion	
		Other (specify)	
	Private Data Sources and Privatization of Data Collection		

Description of Technology or Technique Application:
Laptop computers used for the collection of pavement management distress data.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Use of laptop computers has greatly reduced the paperwork involved with pavement distress data collection which feeds the Pavement Management System.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
By entering the data directly into the laptop, paperwork was greatly reduced. The data is entered into an ORACLE database, which eliminates key entry and reduces errors. This has improved the quality and consistency of the condition data.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Ohio	Agency: Ohio Department of Transportation	
Contact: Kenneth Coran	Title: Pavement Management Engineer	
Street Address: 1980 West Broad Street		
City: Columbus	State: Ohio	Zip Code: 43223
E-Mail: kcoran@odot.dot.ohio.gov	Phone: 614-466-2852	Fax: 614-742-8646

CATEGORY

	Field Data Collection Technique
	GIS/G.P.S. application for Data Collection Integration and Presentation
	Other Data Integration and Presentation Technique
X	Automated Data Collection Equipment
	Private Data Sources and Privatization of Data Collection

DELETED

Description of Technology or Technique Application:
Roughness Pavement Condition Rating Program: raters in the field use laptop computers and pen-based software to eliminate the necessity for paper forms. Data is input directly into the computer, processed and uploaded to the department's mainframe computer.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Software has been developed, tested in the field and is currently being upgraded. Similar software could be developed for HPMS data collection.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
System has speeded up data collection process and improved accuracy of collected data due to the elimination of transcription errors.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Tennessee	Agency: Department of Transportation	
Contact: Donald Reid/Gatha McCollum	Title: Roadway Spec. III/HPMS Coordinator	
Street Address: Suite 900, James K. Polk Building, 505 Deaderick Street		
City: Nashville	State: Tennessee	Zip Code: 37243-0334
E-Mail: **dreid@mail.state.tn.us** Amccollum@mail.state.tn.us	Phone: 615-741-4894 (Reid) 615-741-1590(McCollum)	Fax: 615-532-8451 (McCollum)

CATEGORY

		Field Data Collection Technique
		GIS/G.P.S. application for Data Collection Integration and Presentation
		Other Data Integration and Presentation Technique
X		Automated Data Collection Equipment
	X	Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
		Private Data Sources and Privatization of Data Collection

Description of Technology or Technique Application:
Tennessee is collecting automated pavement distress, IRI, rutting, and crack survey for all of HPMS required systems.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The IRI is being collected in conjunction with the distress for use in the required HPMS program.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
This data is residing in Tennessee Department of Transportation's PMS, which is the source for all the HPMS required items.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Arkansas	Agency: AHTD	
Contact: Ed Flanagan	Title: Administrative Officer II	
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City: Little Rock	State: Arkansas	Zip Code: 72209
E-Mail: Ed.Flanagan@ahtd.state.ar.us	Phone: (501) 569-2110	Fax: (501) 569-2004

CATEGORY		
	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
	X	Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
PEEK WIM recorders collect volume, vehicle classification and weight data at permanent sites. Some sites represent HPMS segments with the rest being used as universe data. ITC Traffic Ace counter/classifiers are used to collect 48-hour volume and vehicle classification data on HPMS segments as well as other selected sites.

Annual average daily traffic estimates (AADT) is calculated using adjustment factors against the volume and classification counts. The vehicle miles of travel are calculated by multiplying the AADT times the segment length for various categories.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Volume and vehicle classification data provide AADT and truck percents.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The recorders and counters/classifiers provide good quality data.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Illinois	Agency: Transportation	
Contact: Rob Robinson	Title: Data Management Unit Chief	
Street Address: 2300 S. Dirksen Parkway		
City: Springfield	State: IL	Zip Code: 62764
E-Mail: robinsonre@nt.dot.state.il.us	Phone: (217) 785-2353	Fax: (217) 524-6251

CATEGORY

	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
	X	Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
For the last three years, the Illinois Department of Transportation has been using magnetic sensors to collect classification data for our State routes and for the HPMS volume and truck data. We are using the NuMetrics HiStar 97 for the collection of approximately 6,000 short-term counts on our state system. The traffic counter collects the classification data by vehicle length and also provides speed data within defined bins.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
We now have complete classification coverage on our State routes, instead of using the previous 300 HPMS classification samples to derive truck VMT. Current truck ADT numbers are available at any location on state system roads. The 300 HPMS classification locations are no longer being counted.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The length classification data is divided into 3 categories (passenger vehicles, single-unit, multi-unit). Utilizing the three length classification categories, we are able to collect thousands of classification counts throughout the state. IDOT has also developed an interactive GIS Internet application that displays all the volume and truck ADT numbers in the state.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Ohio	Agency: Department of Transportation	
Contact: Tony Manch	Title: Engineer	
Street Address: 1980 West Broad Street		
City: Columbus	State: Ohio	Zip Code: 43223
E-Mail: tmanch@odot.dot.ohio.gov	Phone: 614-466-3075	Fax: 614-752-8646

CATEGORY

	Field Data Collection Technique
	GIS/G.P.S. application for Data Collection Integration and Presentation
	Other Data Integration and Presentation Technique
X	Automated Data Collection Equipment
	Private Data Sources and Privatization of Data Collection

DELETED

Description of Technology or Technique Application:
Data is available through "ITS" in the major cities. Mark Hallenbeck is the best person to talk to about using ITS data for planning. Washington State Department of Transportation has its ITS data on two CD-ROMS with software to extract traffic data that is useful for ADTs. Mark Morse is the contact for Washington State data.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Collect data on urban Interstate highways for use in HPMS and other planning applications.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Multiple use of data.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Arkansas	Agency: AHTD	
Contact: Alan Meadors	Title: Planning & Research Assistant Division Head	
Street Address: 10324 Interstate 30		
City: Little Rock	State: Arkansas	Zip Code: 72209
E-Mail: Alan.Meadors@ahtd.state.ar.us	Phone: (501) 569-2201	Fax: (501) 569-2476

CATEGORY

	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
	X	Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Smart Work Zone Congestion Notification – The Smart Work Zones have speed sensors that transmit information to a web site in real time.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
At this time, we do not use this information for HPMS.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
This information was found to be effective 88% of the time.

PART TWO

HPMS NEW TECHNOLOGIES AND TECHNIQUES— FORMS (listed by category)

Private Data Sources and Privatization of Data Collection

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Arkansas	Agency: AHTD	
Contact: Keith Merritt	Title: Staff Planning Engineer	
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E-Mail: Keith.Merritt@ahtd.state.ar.us	Phone: (501) 569-2111	Fax: (501) 569-2476

CATEGORY

	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
X	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
We have outsourced the collection of traffic counts, turning movements, and vehicle classifications.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
Provides traffic data for use in HPMS.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Outsourcing is cost beneficial to the Department.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: California	Agency: Department of Transportation	
Contact: Brian Domsic	Title: Senior Transportation Engineer	
Street Address: 1120 N Street MS #38		
City: Sacramento	State: California	Zip Code: 94274-0001
E-Mail: brian.Domsic@dot.ca.gov	Phone: (916) 653-3272	Fax: (916) 654-6583

CATEGORY

	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
X	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
A contract has been awarded to a private sector consultant to collect "bin count" data on PAS and standard sample sections.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The count data from the contract will provide the necessary data as for AADT, K-factor, D-factor and truck percentages.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
The standard sample records can have the truck data populated thereby easing the problem with sample adequacy.

Alternative methods of estimating truck traffic can be evaluated.

This classified count data will benefit other programs in the department as well as provide needed data for the HPMS. For example, Transportation Planning can use it for goods movement studies.

HPMS NEW TECHNOLOGY AND TECHNIQUES

State: California	Agency: Department of Transportation	
Contact: Brian Domsic	Title: Senior Transportation Engineer	
Street Address: 1120 N Street MS #38		
City: Sacramento	State: California	Zip Code: 94274-0001
E-Mail: brian.Domsic@dot.ca.gov	Phone: (916) 653-3272	Fax: (916) 654-6583

CATEGORY

	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
X	Private Data Sources and Privatization of Data Collection	

Description of Technology or Technique Application:
Contracts for IRI data collection have been awarded to consulting contractors to measure IRI (International Roughness Index) on non-state highways. This is to cover the PAS, standard samples and donut samples.

Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):
The IRI data item (#35) is populated where needed and as is required. Few local agencies or MPOs provide this information.

Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):
Besides having the IRI data for the segments, the state is able to provide some quantitative data to explain the condition of California's roadways.